

**DELIBERATIVE - DO NOT SHARE**  
**OREGON COASTAL NONPOINT PROGRAM**  
**NOAA/EPA FINAL FINDING**

There have been few peer-reviewed studies that have specifically evaluated the extent and effects of aerial application of herbicides in Oregon's coastal nonpoint management area and none on non-fish bearing streams in Oregon's coastal nonpoint management area. Studies in Oregon have found positive detections of hexazinone and 2,4-D ester in water after aerial application.<sup>1</sup> These levels have been below thresholds of concern determined in the studies for people and aquatic life. ODF's Dent and Robben 2000 Study monitored herbicides and fungicides along Type F (fish-bearing) and Type D (drinking water) streams to assess the effectiveness of the FPA pesticide management practices at protecting water quality during drift application.<sup>2</sup> Of 26 sites sampled 24 hours after application, all herbicides detected were at concentrations of less than 1 ppb, below the minimum exposure thresholds for humans and aquatic life. They concluded that the FPA's practices were effective at protecting water quality for Types F and D streams. However, they note they could not draw any conclusions about the FPA's effectiveness at protecting water quality for non-fish bearing streams during the aerial application of herbicides. In a 2012 USGS study<sup>3</sup> in the McKenzie River of the Clackamas Basin outside the coastal zone management area, 43 out of 175 compounds were detected at least once across 28 sites. The study focused on urban, forestry, and agricultural land uses. Nine pesticides were detected out of 14 samples from the drinking water facility's intake from 2002 to 2010. However, concentrations were low, less than 1 part per billion, and the largest number of pesticide detections were associated with urban stormwater. This study was conducted outside the coastal zone management area.

OODF's paired watershed study on the Alsea subbasin also found that while some herbicides were detected, they were not at levels that would pose a significant risk to humans or aquatic life.<sup>4</sup> Following the aerial application of herbicides over a non-fish bearing stream segment that did not have riparian buffers, the researchers measured herbicide concentrations at three locations below the application site: at the fish/non-fish bearing stream interface in the middle of the harvest unit; at the bottom of the harvest unit; and well below the harvest unit. Of the five herbicides that were applied, only glyphosate was detected in any of the samples. An initial pulse of glyphosate, ranging from about 40 to 60 ng/L (ppt), was recorded at the fish/no-fish interface site shortly after spraying but matched concentrations observed at the other two sites (approximately 25 ng/L) after three days. A clear pulse of approximately 115 ng/L (ppt) was recorded at the bottom of the harvest unit during a storm event that occurred eight days after application and another clear pulse of approximately 42 ng/L (ppt) was observed at the interface site during a second storm event ten days after spraying. All glyphosate concentrations recorded throughout the study period were orders of magnitude less than what the literature reported as the lowest observable effect for a variety of aquatic species. However, like the earlier ODF

<sup>2</sup> Dent L. and J. Robben. 2000. *Oregon Department of Forestry: Aerial Pesticide Application Monitoring Final Report*. Oregon Department of Forestry, Pesticides Monitoring Program. Technical Report 7. March 2000.

<sup>3</sup> Kelly, V.J. and C.W. Anderson, 2012. *Reconnaissance of land-use sources of pesticides in drinking water, McKenzie River, Oregon: USGS Scientific Investigations Report 2012-5091*.

<sup>4</sup> National Council for Air and Stream Improvement. 2013. *Measurement of Glyphosate, Imazapyr, Sulfometuron methyl, and Mmetfulfuron methyl in Needle Branch Streamwater*. Special Report No. 130-1.

*January 30, 2015*

assessment, no samples were taken from a non-fish bearing stream segment that was directly under the application site. The water quality impacts to the non-fish bearing stream segment are unknown although one would expect to find higher concentrations of herbicides.

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**Comment [L1]:**

**Comment [L2]:** This would seem to indicate little problem. How persistent are these compounds?

OODF's paired watershed study on the Alsea subbasin also found that while some herbicides were detected, they were not at levels that would pose a significant risk to humans or aquatic life.<sup>4</sup> Following the aerial application of herbicides over a non-fish bearing stream segment that did not have riparian buffers, the researchers measured herbicide concentrations at three locations below the application site: at the fish/non-fish bearing stream interface in the middle of the harvest unit; at the bottom of the harvest unit; and well below the harvest unit. Of the five herbicides that were applied, only glyphosate was detected in any of the samples. An initial pulse of glyphosate, ranging from about 40 to 60 ng/L (ppt), was recorded at the fish/no-fish interface site shortly after spraying but matched concentrations observed at the other two sites (approximately 25 ng/L) after three days. A clear pulse of approximately 115 ng/L (ppt) was recorded at the bottom of the harvest unit during a storm event that occurred eight days after application and another clear pulse of approximately 42 ng/L (ppt) was observed at the interface site during a second storm event ten days after spraying. All glyphosate concentrations recorded throughout the study period were orders of magnitude less than what the literature reported as the lowest observable effect for a variety of aquatic species. However, like the earlier ODF

**Comment [L3]:** Parts per trillion aka virtually none. Reading this section in the context of the other sections it is apparent our data-driven basis for decision is not as strong as for the other MMs. We may need to revise this section somewhat to articulate our basis for decisionmaking is weight-of-evidence or a precautionary principle – I think Christine will be sending some thoughts on this.

<sup>2</sup> Dent L. and J. Robben. 2000. *Oregon Department of Forestry: Aerial Pesticide Application Monitoring Final Report*. Oregon Department of Forestry, Pesticides Monitoring Program. Technical Report 7. March 2000.

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**Comment [L4]:** w